DIGITAL CAMERA WITH MULTI-ILLUMINATING SOURCE

2 BACKGROUND OF THE INVENTION

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4	The present invention relates to a digital camera with a multi-illuminating
5	source, and more particularly to a digital camera that not only has a flash light

illuminating source, but also has an infrared illuminating source.

7 2. Description of Related Art

Due to the developing technology of digital cameras, there is a tendency
that the digital camera is gradually becoming as common as the conventional
camera. The photograph taken by the digital camera is stored as a digital photograph
file, thus the digital photo file is suitable for use in in many fields. The digital
photo file is often transferred to clothes and printed on many objects, such as
cups, keepsakes etc. Furthermore, one of the advantages of the digital camera is
that the digital photo file is able to be stored in a computer, so all photos can be
compactly and pristinely kept for eternity.

Conventionally, the digital camera only has a single illuminating light source for use in low light during the day. When the flash lamp light is used, the digital camera is only suitable for a specific illuminating condition.

To overcome the shortcomings, the present invention tends to provide a digital camera with a multi-illuminating source to mitigate and obviate the aforementioned problems.

SUMMARY OF THE INVENTION

The main objective of the invention tends to provide a digital camera with a multi-illuminating source, wherein the digital camera has an infrared

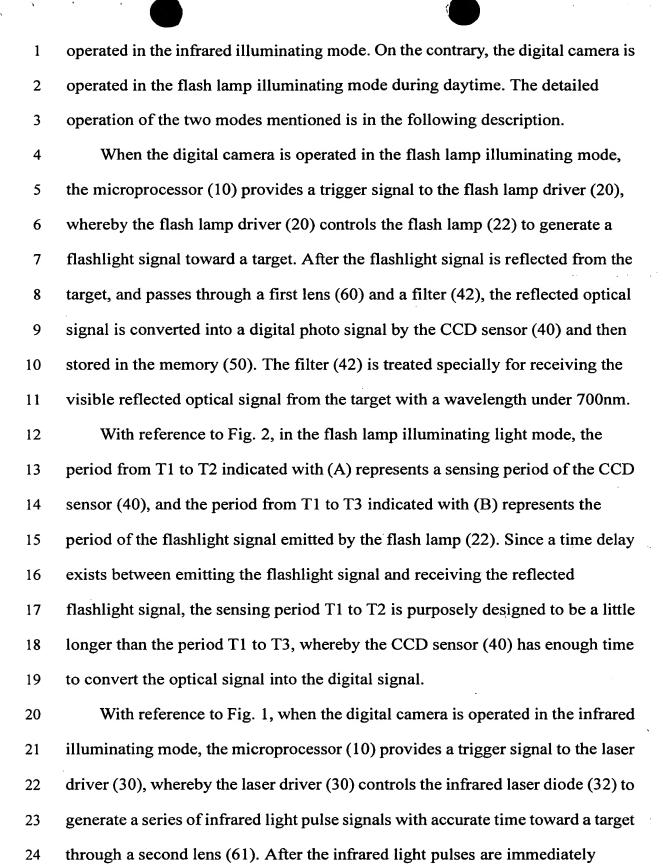
- 1 illuminating source for use in an insufficient light situation, such as at night, and
- 2 a flash lamp light source for use in a low light situation, such as a cloudy day.
- 3 Other objects, advantages and novel features of the invention will become
- 4 more apparent from the following detailed description when taken in
- 5 conjunction with the accompanying drawings.

6 BRIEF DESCRIPTION OF THE DRAWINGS

- Fig. 1 is a block diagram of a digital camera in accordance with the present
- 8 invention;
- 9 Fig.2 shows timing control signals of a CCD sensor, and a flash lamp light
- signal in accordance with the present invention;
- Fig.3 shows timing control signals of a CCD sensor, and a laser light signal
- in accordance with the present invention; and
- Fig. 4 is a graph of transmittance versus wavelength for a filter shown in Fig.
- 14 1 in accordance with the present invention.

15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

- With regards to Figs. 1 and 2, a digital camera in accordance with the
- 17 present invention comprises a microprocessor (10) connected to a flash lamp
- driver (20), a laser driver (30) and a charge coupled device (CCD) sensor (40).
- 19 The CCD sensor (40) is further connected with a filter (42) and a memory (50).
- 20 The flash lamp driver (20) and the laser driver (30) are respectively connected
- 21 with a flash lamp (22) and an infrared laser diode (32) (IR LD).
- The digital camera disclosed in this application is able to be operated in two
- 23 modes, a flash lamp illuminating mode and an infrared illuminating mode.
- When the surrounding light is insufficient such as at night, the digital camera is



- reflected from the target, and pass through the first lens (60) and the filter (42),
- 2 the reflected infrared light signals are converted into a digital photo signal by the
- 3 CCD sensor (40) and then stored in the memory (50). The filter (42) also can
- 4 receive the infrared signal with 890nm wavelength. Furthermore in this
- 5 invention, the infrared laser diode (32) is able to be replaced by an infrared light
- 6 emitting diode (IR LED).
- With reference to Fig. 3, in the infrared illuminating mode, the signal (A)
- 8 represents the sensing period of the CCD sensor (40), and the signal (B)
- 9 represents the emitted infrared light pulse signal. Because the speed of the
- infrared light signal is very fast, i.e., almost no time delay, the sensing period of
- the CCD sensor (40) is synchronized to the emitted infrared light signal.
- With reference to Fig. 4, the characteristic chart of the filter (42) is shown.
- 13 The filter (42) is treated speially for receiving visual light with a wavelength
- under 700nm and invisible infrared light with a wavelength 890nm. The light
- signals with wavelengths other than 890nm and under 700nm are obstructed by
- 16 the filter (42).
- 17 Although the present invention has been explained in relation to its
- preferred embodiment, it is to be understood that many other possible
- modifications and variations can be made without departing from the spirit and
- 20 scope of the invention as hereinafter claimed.